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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,354	04/05/2002	Alan Michael Cox	7435-2	6273

7590 09/28/2004

Thomas Q Henry
Woodard Emhardt Naughton Moriarty & McNett
111 Monument Circle
3700 Bank One Tower
Indianapolis, IN 46204

EXAMINER

NGUYEN, PHILLIP

ART UNIT PAPER NUMBER

2828

DATE MAILED: 09/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/019,354

Applicant(s)

COX ET AL.

Examiner

Phillip Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/31/02</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

1. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, **the first polarisation rotation element (b) and a polarisation selection element (d)** must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

It is noted that there is only one figure in this application. In this figure, only 3 elements which are a gain medium 1, a Faraday rotator 2, and a non-linear crystal 3, plus 4 mirrors 4-7 while there are at least 4 elements plus the mirrors.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4, 6-8 and 10-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites “the plane” which is lack of antecedence basis.

Claims 6-8 fail to define the angles of the mirrors with respect to other components or optical paths; therefore it is not clear how the angles are formed. Claims 10-11 are a little bit clearer about the reference angle; however, they still fail to define the “normal” whether it is a normal incident angle or normal to the mirrors.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-11 and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Johnston, Jr. et al. ('158).

With respect to claim 1, Johnston discloses in Figures 1-3 a ring laser cavity comprising a gain medium 20; a first polarisation rotation element 48 arranged to rotate the polarisation of

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light propagating in the cavity with a predetermined handedness irrespective of the direction of propagation of the light; a second polarisation rotation element 46 arranged to rotate the polarisation of light propagating in the cavity with a handedness which is dependent upon the direction of propagation of the light; a polarisation selection element 30 arranged to cause loss to light propagating in the cavity, the loss being determined by the polarisation of light incident upon the polarisation selection element; wherein the polarisation selection element comprises at least one mirror spaced away from the gain medium and arranged to reflect light at an angle displaced from the normal such that the reflectivity of the at least one mirror 34 is sufficiently polarisation dependent that the laser oscillates uni-directionally.

With respect to claims 2-3, Johnston also discloses the cavity comprising three or more mirrors 12, 14, 16 and 18.

With respect to claim 4, Johnston discloses the p and s polarisation directions of laser light in the cavity by arrow 50 which is out of the plane defined by the other three mirrors.

With respect to claim 5, Johnston discloses the second polarisation element comprising a Faraday rotator 46.

With respect to claims 6-8, since the angles of the mirrors are not clearly defined, the angles of mirrors disclosed by Johnston could be any degree between 25 and above.

With respect to claim 9, Johnston discloses the at least one angled mirror comprising 2 mirrors, which is element 34, arranged to reflect light at an angle displaced from the normal such that the cumulative reflectivity of the two mirrors is sufficient polarisation dependent that the laser oscillates uni-directionally.

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With respect to claim 10-11, Johnston discloses at least one mirror being concave (14, 16, or 18) and the reflected light angle could be from 0-360 degrees.

With respect to claims 18-19, at least two mirrors 12, 16 and 18 are spaced away from laser gain medium.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston, Jr. et al. ('158) in view of Dixon ('491). Johnston discloses the claimed invention except for a frequency-doubling element arranged to double the frequency of the light generated by the gain medium comprising a crystal of YAG doped with a suitable element. Dixon discloses in Figure 7 a ring cavity including a gain medium 30 having YAG doped with Nd, a unidirectional element which is a Faraday rotator 47, a non-linear crystal 10 which is a frequency doubling element comprising KTP and wherein the semiconductor device pumping light on the side of the gain medium with the corresponding profile to the gain medium except for a first polarization rotation element. For the improvement of the ring cavity, it would have been obvious to the one having ordinary skill in the art at the time the invention was made to provide a frequency doubler

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made of KTP and gain medium made of Nd:YAG as taught by Dixon in order to obtain at least a second harmonic signal with higher frequency.

Citation of Pertinent References

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The patent to Dixon discloses Intracavity Harmonic Sub-Resonator with Extended Phase Matching Range, U.S. Patent No. 5289491

The patent to Johnston, Jr. et al. discloses Broadband Optical Diode for a Ring Laser, U.S. Patent No. 4272158

Communication Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip Nguyen whose telephone number is 571-272-1947. The examiner can normally be reached on 9:00 AM - 6:00 PM.

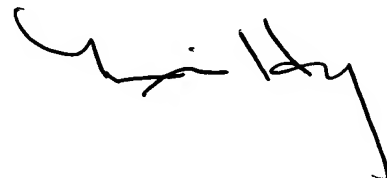
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MINSUN HARVEY, can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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**MINSUN OH HARVEY
PRIMARY EXAMINER**